

DESCRIPTION OF A NEW SPECIES OF NET-WINGED MIDGE (DIPTERA: BLEPHARICERIDAE) FROM THE SIERRA NEVADA DE SANTA MARTA, COLOMBIA¹

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ABSTRACT. The status of the genus *Limonicola* is reviewed, and a preliminary generic diagnosis provided. The genus presently includes the type species, *L. plurivectis* Lutz, 1928, from Venezuela, *L. leucoptera* Edwards, 1929, from Peru, and a new species named herein *L. davila*, from the Sierra Nevada de Santa Marta, Colombia.

RESUMEN. Se considera el estatus del género *Limonicola* y se da una diagnosis genérica preliminar. Actualmente este género incluye la especie tipo *L. plurivectis* Lutz, 1928, procedente de Venezuela, *L. leucoptera* Edwards, 1929, de Peru, y una nueva especie de la Sierra Nevada de Santa Marta, Colombia nombrada aquí *L. davila*.

INTRODUCTION

The dipteran fauna of torrential waters in South America comprises several taxa whose immatures are highly adapted to life in swiftly flowing streams. Although widespread and common, two of these taxa, the Blephariceridae ("net-winged midges") and the genus *Maruina* Müller, 1895, of the Psychodidae ("lance-winged midges"), are poorly studied. This is unfortunate because their close association with head-water streams, poor dispersal abilities, and great geological age make them particularly useful paleogeographic indicators. Their present distributional patterns can provide data on the positions of tectonic plates and orogenic zones in the past. For this reason, it has long seemed evident to me that these midges might offer significant clues to former relationships between elevated land masses along the Caribbean borderlands of South America, and consequently I have made efforts to collect and analyze material from these areas. One such tectonic unit is the Sierra Nevada de Santa Marta (hereinafter called "Sierra") in northern Colombia that has been the subject of geologic studies (Tschanz et al., 1974) and faunistic investigations on butterflies (Adams, 1973; Adams and Bernard, 1977), reptiles and amphibians (Duellman, 1979:382-4), and plants (Sugden and Robins, 1979).

The present paper is a partial report on my collections of Blephariceridae and *Maruina* made in March of 1980. In future papers, I plan to review my other collections and describe additional species of Blephariceridae (*Paltostoma* Schiner, 1866) and Psychodidae (*Maruina*).

Collection sites pertinent to the present paper are listed by field numbers below with brief habitat descriptions. All distances

are kilometers by road. All localities are situated in the Department of Magdalena except CLH 257, which is in Guajira Department.

CLH 257. Río Ancho and Highway No. 2, 11 March. A wide, shallow river with a bottom entirely of medium-size, rounded boulders. Collections made in morning on both sides of highway bridge crossing the river about 1-2 km from its exit to the sea, on coastal plain at an elevation of only 90 m. Water temperature 25°C.

CLH 259. Quebrada Donama, 5 km northeast of Mamatoco, 12 March. A rushing stream flowing over a hard rock substratum with scattered mixed-sized boulders. Collections made behind a house between road (to Minca) and stream at an elevation of approximately 100 m. Water temperature 25°C.

CLH 260. Quebrada Minca, 12 March. A wide, shallow, cold water (23.5°C) stream flowing through village. Collections made immediately west of village, on medium to small, rounded, loose boulders. Elevation 800 m.

CLH 263. Río Gallina (tributary of Río Sevilla) near Finca California, 11.2 km northeast of Palmar, 13 March. Large stream flowing with considerable velocity through a steep canyon of large, fixed boulders and intermittent rapids. Collections made near bridge just above ranch house at approximately 1,500-m elevation. Water temperature 21°C.

CLH 264. Quebrada Charua (tributary of Río Gallina), near Finca California, 11.2 km northeast of Palmar, 13 March. Small, steep, stepped stream with intermittent dams of large, fixed boulders. Collections made near confluence with Río Gallina.

CLH 267. Río Sevilla, 8.7 km southeast of Palmar, 14 March. Large rushing stream flowing through steep gorge, inclinous, intermittently forming slips over bare rock exposures, falls through gigantic boulder dams, and large pools. Water temperature 24°C. Elevation approximately 800 m.

The water at all localities was free of visible pollution and generally in good ecological condition. All streams appeared to

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be near their lowest normal flows in response to the dry season, which reaches its height on the Sierra in March. Rock types forming their beds are varied, but light-colored granites, quartz diorites, and hard metamorphics predominate.

TERMINOLOGY

Special morphological and descriptive terms applied herein are explained in the text and figures. For the genitalia, I follow the interpretations of homologies as given in my most recent paper (Hogue, 1981). Reference to my papers of 1973 (general) and 1978 (larval chaetotaxy) will provide the reader with further explanations of abbreviations and the particular nomenclature applied to the family.

I refer to the variously shaped, short sensilla of the larval dorsum as "tuberculiform" (sensilla tuberculiforma) to distinguish them collectively from the hairlike sensilla (sensilla chaetica). The tuberculiform types may be further characterized by specific shapes such as conoid (acorn-shaped), clavate, or ovoid; these may be straight or sharply curved at the base (falcate).

SYSTEMATICS

Blepharicerinae and Paltostomatini
sensu Zwick, 1977, and pers. comm.

Genus *Limonicola* Lutz

HISTORY

Lutz proposed the genus *Limonicola* in 1928 to include an unusual blepharicerid that he collected in the Limón River near Maracay, Venezuela. In his publication (Lutz, 1928), he noted that the unique characteristic separating this new entity from other genera was the male's very long hind legs, with swollen basal tarsal segments. He described the type species, *plurivectis*, from complete material of all stages, but his specimens have become lost. A year later, Edwards recognized a new Andean species as belonging to *Limonicola* and described it in his monumental treatment on the Diptera of Patagonia and South Chile (Edwards, 1929:73–74). The species was named *leucoptera* and was based on a single male, the type of which I have not examined.

Because of the absence of good material from Lutz's and Edwards's work for comparative and diagnostic reference, no further species have been added to date (Hogue, 1971), and *Limonicola* has become an enigmatic taxon with undefined boundaries and cryptic affinities. I have material now on hand of these and several additional new species, excluding that from the Sierra described below. From this and good series of all stages from the Sierra, it is now realized that the genus is truly distinct in many characters and contains numerous species widely distributed over the mountainous terrain of northwestern South America.

A full generic definition will not be possible without further study. However, in order to provide a basis for particularization

of the new species, I am providing here a preliminary definition of the genus based on its salient features.

DESCRIPTION

Adult

Small, short-bodied, fragile Blephariceridae.

Coloration. Body integument well sclerotized, dull, velvety-black with opalescent reflections, especially on abdomen; some sclerites and membranes dark brown. Wing membrane infusate in both sexes.

Size. Small, wing length ranges, male 3.5 to 9.5 mm; female 2.8 to 9.0 mm. Male slightly larger than female.

Structure. Head: Colocephalous [amandibulate, misproportioned head, as defined by Hogue, 1970:7] in both sexes. Ocellar lobes slight, ocelli sessile. Eyes disjunct, entire, and without callis oculi [unfacetted strip]; ommatidia subequal, large in male, somewhat smaller in female. Proboscis very short, mouthpart elements greatly reduced and modified: labrum narrowly lanceolate; mandibles totally absent in both sexes; hypopharynx vestigial, slightly larger in female but always less than half the length of labrum; maxillary palpus composed of a single diminutive segment, lacinia similar to palpus but weaker and with obliquely rounded apex; labellum composed of deeply furcate, elongate lobes. Antenna short, 15-segmented; flagellomeres subglobose.

Thorax: Sclerites generally typical for Blepharicerinae; scutum somewhat larger than in most genera and projecting farther forward, giving entire thorax an oblique set in lateral view; katapisternum truncate ventrally; pleural suture sinuous, forked (posterior branch separating dorsal portion of meron, itself broken into two portions, a small triangular lower plate and a larger, upper lobate swelling; the convex anterior part of the latter extends over the pleural suture, forming a pitlike depression beneath).

Wing: Broad as in other Paltostomatini but with a hyperexpanded anal lobe. Venation typical for tribe, with reduced longitudinal veins: subcosta evanescent; fork of R_s near wing apex; M_3 absent; $M_3 + 4$ (false crossvein) lacking; 1A sometimes not reaching wing margin. Posterior veins decidedly more weakly sclerotized than radius and costa.

Legs: Strongly sexually dimorphic: in males very long and slender, especially the hind leg, which is twice the length of others and has inflated tibial apex and tarsal segments 1 and 2; fore femur sinuously curved; all tarsal segments 5 with ventrobasal lobes bearing large setae (calcipalae); tarsal claws elongate and slender, with subbasal tooth. Legs in female short and normally proportioned except fore femur, which is strongly upcurved basally and abruptly swollen apically; hind femur moderately upcurved, hind tibia slightly curved sinuously; tarsal segments 5 and claws simple. Tibial spurs usually lacking from all legs in both sexes, hind tibia of female sometimes with pair of equal spurs.

Abdomen: Short, strongly tapered posteriorly. Sclerites moderately sclerotized, especially sternites; pleural membranes wide. Tergite I very narrow, well sclerotized laterally only.

Male genitalia: Segment VIII ligulate. Tergite IX broad, posterior margin unmodified. Lobes of Xth tergite well developed, ventrolateral portions lobate, converging. Tegmen complex, dorsomesal portion convex, raised into a longitudinal slitlike fold. Vesica large, spherical, with transverse, dorsal, lobate apodeme. Aedeagal rods three, short, equal, attenuate filaments. Lateral tine undeveloped. Genital capsule (fused hypandrium and gonocoxite) broadly membranous mesally. Outer lobe of gonostylus variously shaped, generally with dorsal and ventral lobes; inner lobe of gonostylus transverse, with ventral extension, which is fused with the posterior margin of the genital capsule.

Female genitalia: Tergite VIII narrow, distinct from tergite IX. Sternite VIII well sclerotized medially, developed into a deeply emarginate (bilobed) plate. Oviscapt (hypogynial plate) complex, posterior lobes directed mesad, apices spiculate (and with a few minute setae), midportion constricted. Genital fork well defined, a transverse stirrup-shaped plate. Lateral lobes of sternite IX (normally present in the Blepharicerinae) absent. Proctiger sclerotized basally to form a transverse plate similar to genital fork (but with shorter arms). Lobe of tergite X (cercus, auct.) deeply cleft, with a distinct ventral secondary lobe. Three ovoid spermathecae.

Pupa

Depressed. Outlined shape oval, lateral margins of abdominal segments moderately convex, that of segment II strongly convex (more so in female), thoracic region abruptly narrowed.

Coloration. Upper surface evenly black (in life); lower surface white.

Size. Small to medium-sized, body lengths 2.8 to 7.0 mm. Male pupa slightly larger than female and more elongate.

Structure. General dorsal cuticle and under folded lateral margins of abdomen coarsely and densely verrucose. Scutellar sclerite broad, reaching nearly to lateral extreme of metascutal sclerite; abdominal segments I and II curving strongly anterad laterally. Branchiae with heavy, expanded bases; that of anterior-most lamella bullate laterally; branchial posture porrect, all plates elongate, subtriangular, rigid, with acute apices, and of about equal length but inner pair much narrower than outer. Antennal and mouthpart cases ill-defined. Ventrolateral adhesive organs present on abdominal segments II–V (four pairs).

Fourth-Instar Larva

Size. Small to medium-sized, body lengths 3.7 to 9.0 mm.

Structure. Intercalary convexities (Fig. 11) undeveloped. Head capsule weakly sclerotized (hind margin evanescent), with deep lateral insertions and lateralia. Antenna short, 2-segmented, the proximal segment about one-third length of distal. Dorsal pseudopod absent from segments of anterior and median divisions; present and similar to pseudopods, but smaller, on terminal segment. Dorsal sclerotized plates, tubercles, or other processes entirely absent. Ventral gill filaments digitiform, arranged in two slightly disjunct, stellate clusters, the anterior usually with six filaments, the posterior with four filaments. Pseudopods elongate, directed laterad, only slightly downcurved; subequal in

length (about one-quarter width of segment) except that of segment I, which is one-half the size of others. Ventral integument of each abdominal segment basal to pseudopod, dorsal pseudopod of terminal segment, and sclerotization of terminal lobe with numerous denticles grading to papillae mesad.

Chaetotaxy. Primary trunk sensilla as follows: *ic* slightly ventral on anterolateral corner of segment, minute and difficult to see because of sclerotization in this area; *it* in normal position, minute; *is* double, associated with anteromesal invagination of each segment; *tM-T* forming a quadrate constellation in center of dorsum, chaetiform; *tI-VIII* normal in position, tuberculiform; *stPI-VIII* normally positioned, chaetiform; *stM-T* just lateral to *t*, tuberculiform; *pdpod* not evident; *dpod* on dorsal pseudopod of segment VII only, both chaetiform; *p* not evident; *sp* obscured by proliferation; *ssP-T* in line, large chaetiform; *pdl-VI* normal. Secondary sensilla of small tuberculiform and chaetiform types generally and evenly distributed over dorsum, latter most numerous laterally, former absent from pseudopods but forming a noticeably denser field middorsally (circular concentration); anterior and posterior lobular portions of each segment often free of sensilla; no conspicuously large flat or specially modified sensilla in linear series or otherwise. Terminal setae very small and few in number.

Limonicola davila new species

(Figs. 1–12)

DIAGNOSIS

Limonicola davila is most similar to *plurivectis*. From that species and the only other described species in the genus, *leucoptera*, it may be identified by the following primary structural differences in all known stages.

Adult Male

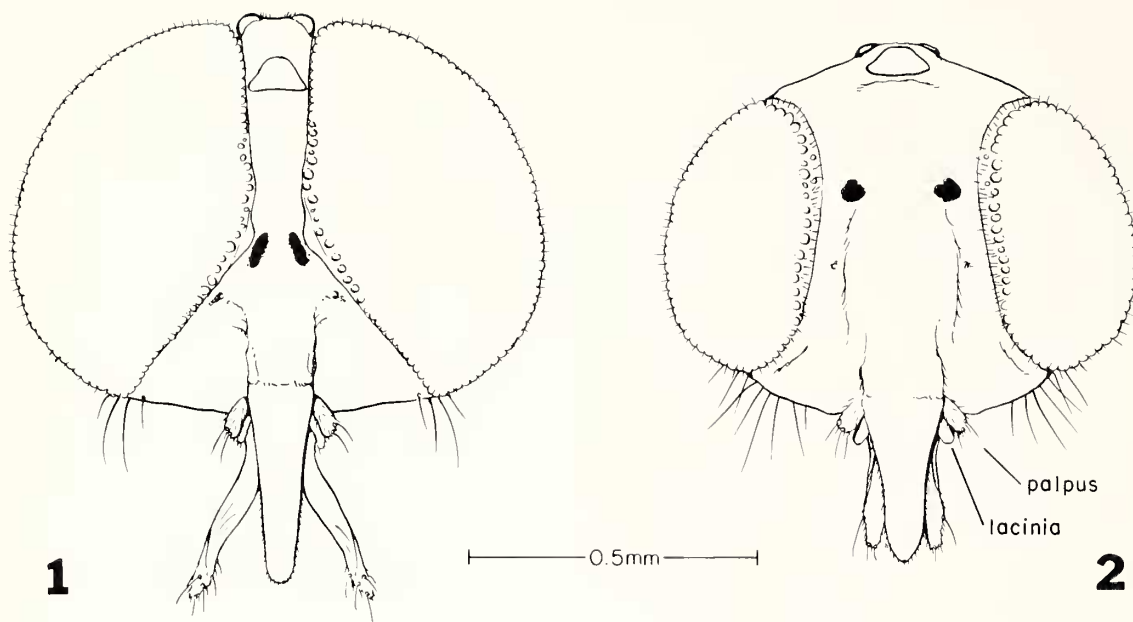
The transverse, strongly asymmetrical, V-shaped dististyle of *davila* is unique; in the two other species, this structure is subhexagonal and roughly symmetrical.

Adult Female

The tarsal claws of both *davila* and *plurivectis* are similar, short and broad, whereas those of *leucoptera* are long and slender. Paralleling this condition is the length of tarsal segment 5 and the presence or absence of calcpalae: long (over twice length of segment 4) and without calcpalae in *davila* and *plurivectis*, short (about equal to length of segment 4) and with calcpalae in *leucoptera*. The shape of the oviscapt lobes of the genitalia also distinguish *davila* from *plurivectis*: with an evenly narrowed apex in the former, broad and basally constricted in the latter.

Pupa

The pupae of *davila* and *plurivectis* are similar but that of the former may be distinguished from the latter most easily by the more extensive verrucae on the scutum and branchial sclerite: in *davila*, the verrucose area of the scutum extends medially to the metascutal sclerite and covers the entire branchial sclerite pos-



Figures 1 and 2. *Limonicola davila*. Heads, frontal view. Figure 1, male; Figure 2, female.

terior to the branchioalar suture; in *plurivectis*, the scutal verrucae are restricted to the central area and cover only the anterior half of the branchial sclerite. Also, the bullate posterior basal extension of the anterior branchial lamella is much larger in *davila* than in *plurivectis*. *L. davila* differs from *leucoptera* by its smaller size (3.0 to 3.4 mm body length versus 3.4 to 4.0 mm), its relatively larger and more widely spaced integumentary verrucae, and the virtual absence of a bullate swelling on the posterior extension of the anterior branchial sclerite base.

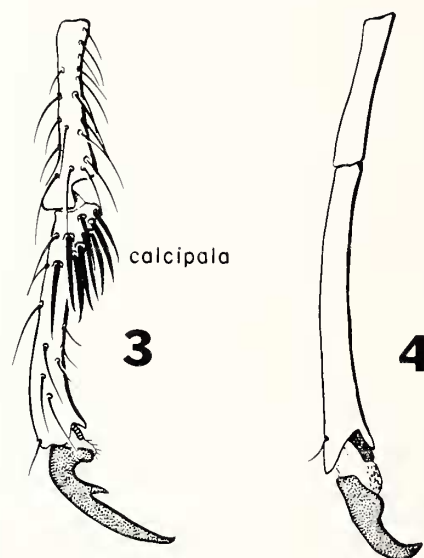
Larva

Gross differences separate the larvae of the three species: *davila* and *leucoptera* are alike in the sparsity of conspicuous, large, dorsal, integumentary, tuberculiform sensilla, which are present in *plurivectis*; the larva of *leucoptera* is easily distinguished from that of *davila* by its significantly larger dorsal pseudopod of the terminal division; the organ also is well separated and extrorse in *davila*, nearly reaching the level of the posterior margin, but is almost adnate to the terminal margin in *leucoptera*.

DESCRIPTION

Adult (Figs. 1-9)

Size. Small, measurements as follows: wing length male (range, N = 10) 3.5 to 3.9 mm, mean 3.7 mm; female 2.8 to 3.8 mm,



Figures 3 and 4. *Limonicola davila*. Hind tarsal segments 4 and 5 and tarsal claws. Figure 3, male; Figure 4, female.

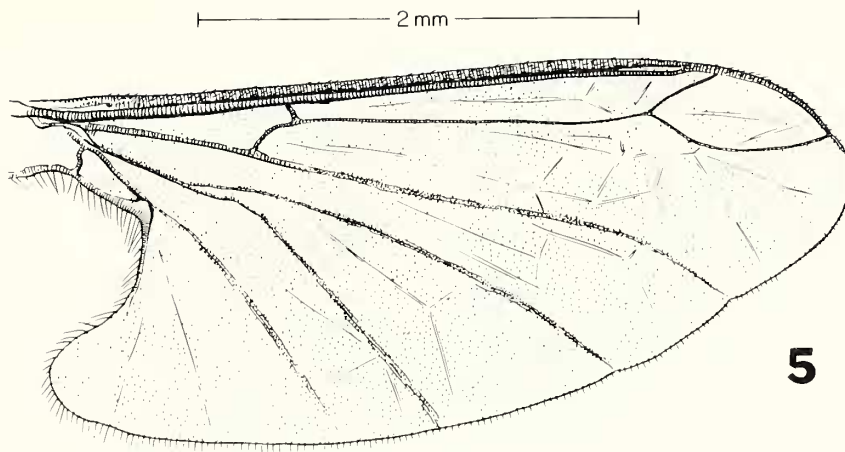
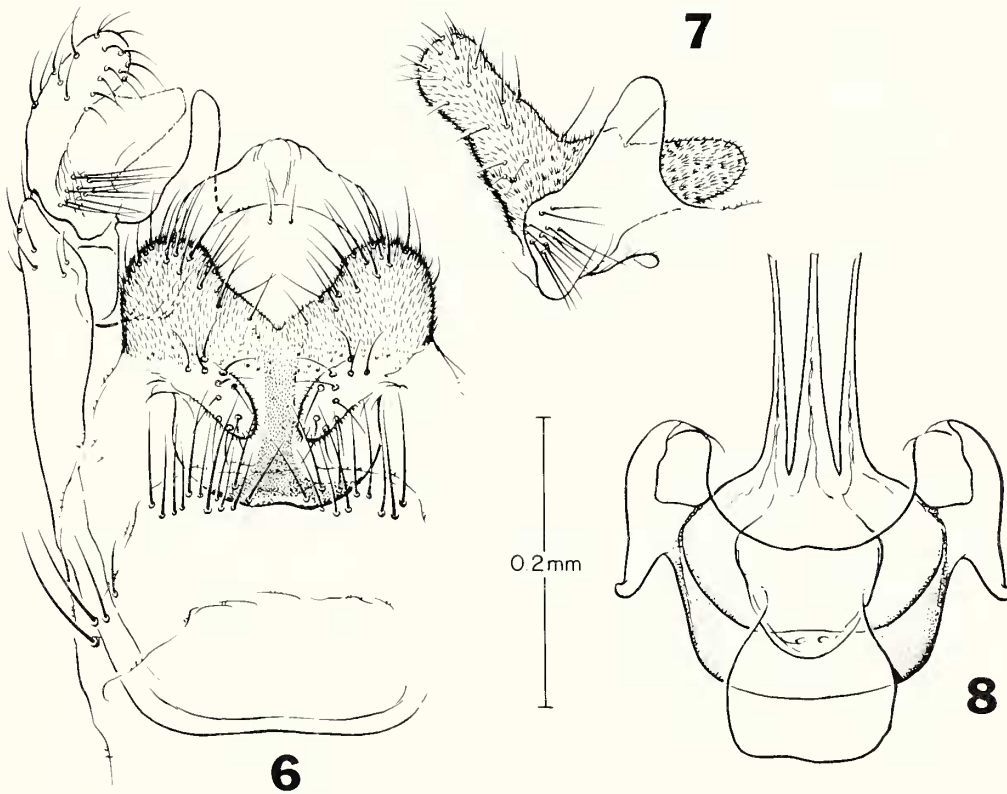


Figure 5. *Limonicola davila*. Wing.



Figures 6 through 8. *Limonicola davila*. Male genitalia. Figure 6, entire structure, dorsal view; Figure 7, inner and outer gonostyles, ventral view; Figure 8, phallic complex, dorsal view.

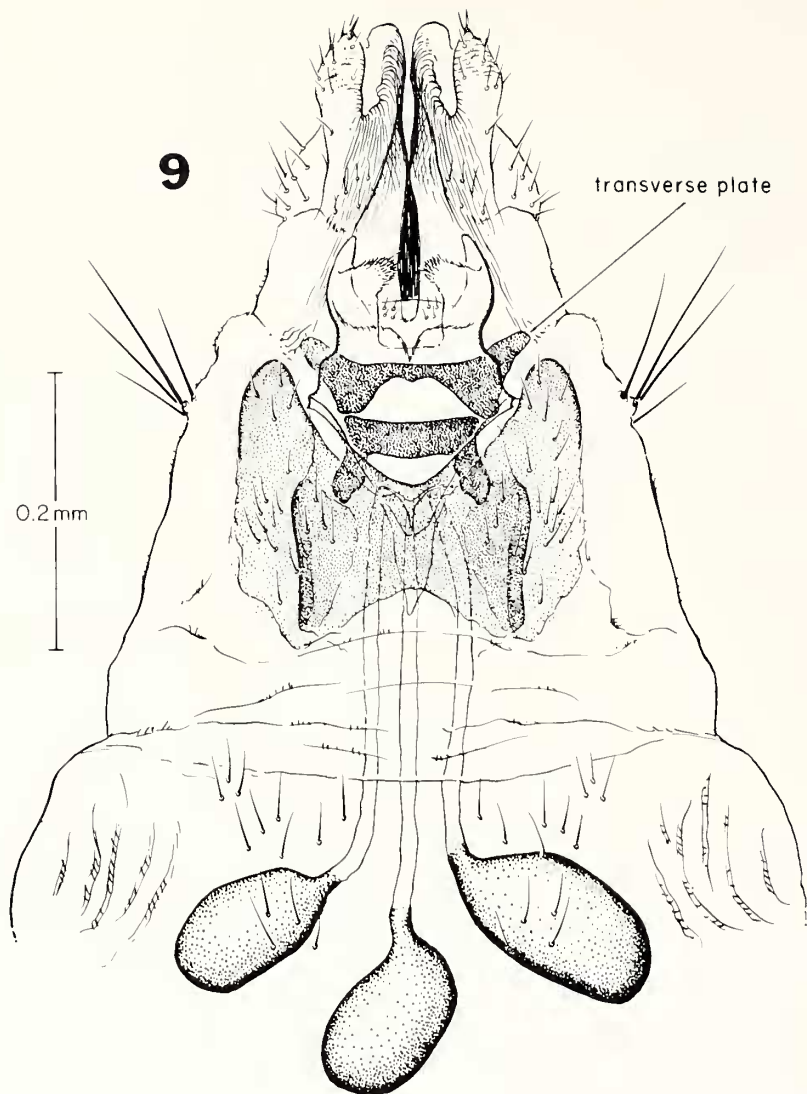


Figure 9. *Limonicola davila*. Female genitalia, ventral view.

mean 3.2 mm. Leg segment lengths given in Table 1.

Structure. Head (Figs. 1–2): Ocular bristles short (about 1.5 width of ommatidium) and single over nearly all of eye. Mouthparts: Labellar lobe short, barely exceeding apex of labrum in male, slightly short of this point in female; lobe with only a few apical setae in both sexes.

Legs: Female tarsal segment 5 over twice as long as segment 4 and without setae except for single, small apicodorsal bristle (Fig. 4). Tarsal claws and calcipalae normal for genus (Figs. 3–4). Tibial spurs entirely lacking.

Wing (Fig. 5): Venation typical.

Abdomen: Setae of sternite VII lacking mesally in both sexes.

Male genitalia (Figs. 6–8): Setae of IXth tergite in two disjunct groups, a posterior group of several medium-sized hairs and an anterolateral group of fewer and generally heavier hairs. Lobe of Xth tergite about as long as broad, apex slightly incurved,

inner margin angled; internal, ventrolateral lobe well developed and with rounded apex. Outer lobe of gonostylus (Fig. 7) transverse, strongly asymmetrical, open V-shaped in mesal view.

Female genitalia (Fig. 9): Lobe of plate formed from sternite VIII narrowly rounded at apex; anterior border of plate emarginate; 29–30 setae on each side of plate. Base of oviscapt (hypogynial plate) only slightly broader than lobular portion; lobe with evenly narrowed, spiculate apex. Necks of spermathecae short, 1.5–2 times width. Transverse inner plate of proctiger (Fig. 9, “transverse plate”) asymmetrically bifurcate laterally, the posterior fork much longer than the anterior.

Pupa (Fig. 10)

General shape and morphology typical for genus.

Size. Small, male body length range 2.9 to 4.1, width 1.7 to 2.5 mm (N = 20; means 3.5 and 2.0 mm); female body length range

Table 1. Leg segment lengths of male and female *Limonicola davila*. Unit of measurement is millimeters; values are ranges (N = 14) followed by means.

	Male	Female
Fore leg		
Femur	1.2–1.5, 1.3	0.66–0.96, 0.79
Tibia	1.4–1.7, 1.6	0.74–1.06, 0.86
Tarsus 1	1.04–1.30, 1.21	0.48–0.65, 0.51
2	0.48–0.59, 0.55	0.20–0.30, 0.25
3	0.29–0.34, 0.31	0.17–0.23, 0.20
4	0.20–0.23, 0.21	0.15–0.20, 0.17
5	0.21–0.26, 0.24	0.30–0.39, 0.34
Mid leg		
Femur	1.3–1.5, 1.4	0.70–0.90, 0.82
Tibia	1.3–1.6, 1.4	0.68–0.92, 0.79
Tarsus 1	1.06–1.16, 1.11	0.41–0.58, 0.48
2	0.44–0.57, 0.51	0.20–0.27, 0.23
3	0.26–0.32, 0.30	0.17–0.23, 0.19
4	0.19–0.24, 0.21	0.14–0.20, 0.16
5	0.21–0.25, 0.23	0.31–0.41, 0.34
Hind leg		
Femur	3.1–3.9, 3.6	1.4–1.9, 1.6
Tibia	3.7–4.5, 4.2	1.4–2.0, 1.7
Tarsus 1	1.44–1.68, 1.56	0.44–0.60, 0.50
2	0.68–0.76, 0.74	0.21–0.30, 0.25
3	0.51–0.58, 0.55	0.17–0.25, 0.20
4	0.32–0.37, 0.34	0.15–0.20, 0.17
5	0.23–0.27, 0.25	0.30–0.40, 0.34

2.8 to 3.8 mm, width 1.6 to 2.2 mm (N = 20; means 3.2 and 1.9 mm). Proportions length/width, male 1.75, female 1.68.

Structure. Verrucae of dorsal integument relatively large and widely spaced (6 in line per 0.1 mm); extensive on thorax: those of median portion of scutal field extending posteriorly to meta-scutal sclerite, and those of lower portion of branchial sclerite covering entire sclerite posterior to the branchioalar suture. Bullate posterobasal portion of anterior branchial lamella large.

Fourth-Instar Larva (Figs. 11–12)

General shape and morphology typical for genus.

Coloration. Generally yellowish gray-brown or medium-brown, intermediate forms with varying amounts of brown mottling on light background: pigmented areas usually confined to escharae (sclerotizations externally marking points of muscle insertions) but may expand transversely over dorsum, often selectively coloring segments III and V, giving larva a double-banded appearance.

Size. Small, body length: range of random specimens (N = 54) 3.7 to 5.5 mm, mean 4.6 mm; of mature specimens only (i.e. pupal branchiae visible) (N = 24) 3.7 to 5.5 mm, mean 4.6 mm; head capsule width, range (N = 54) 0.90 to 1.30 mm, mean 1.11 mm.

Structure and Chaetotaxy (Figs. 11–12). Secondary tuberculiform sensilla of dorsum sparse and mostly very small, conoid to ovoid in shape, including those of median circular group. Dorsal

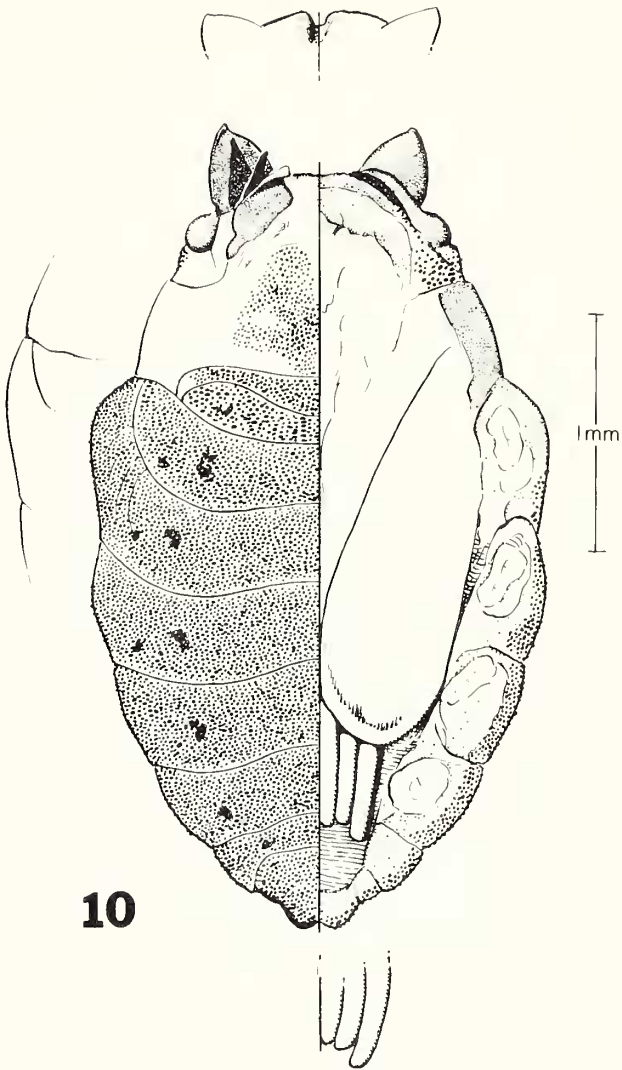


Figure 10. *Limonicola davila*. Pupa, female (dorsal left, ventral right), satellite details of adjacent male features.

pseudopod of segment VII relatively large and well separated and directed away from the terminal lobe.

MATERIAL

Type Material

HOLOTYPE male (completely dissected and mounted on slides Nos. CLH 80-112 a-d); COLOMBIA, Department of Magdalena, Sierra Nevada de Santa Marta, Río Gallina at Finca California, 1,500 m, 13 March 1980, C. L. Hogue, CLH 263. ALLOTYPE female (completely dissected and mounted on slides Nos. CLH 80–85 a-d); same data as holotype. 21 male, 23 female PARATYPES (pinned, in alcohol, and mounted on slides); same data as holotype.

Holotype and allotype deposited in the collection of the In-

stituto Nacional de los Recursos Naturales Renovables y del Ambiente, Bogotá (INDERENA). One paratype male and female sent to National Museum of Natural History, Washington, D.C. (USNM) and British Museum (Natural History) (BMNH), London. All others in Natural History Museum of Los Angeles County (LACM).

Additional Specimens

COLOMBIA. Department of Guajira, Sierra Nevada de Santa Marta, Río Ancho and Highway No. 2, 11 March 1980, C. L. Hogue, CLH 257 (325 larvae, 75 pupae: INDERENA, USNM, BMNH, LACM). Department of Magdalena, Quebrada Donama, 5 km NE Mamatoco, 12 March 1980, C. L. Hogue, CLH 259 (3 larvae, 4 pupae, 15 males, 1 female: LACM); Quebrada Minca, Minca, 12 March 1980, C. L. Hogue, CLH 260 (142 larvae, 47 pupae, 21 males: LACM); Río Gallina, Finca California, 13 March 1980, C. L. Hogue, CLH 263 (2 larvae: LACM). Quebrada Charua, tributary to Río Gallina, Finca California, 13 March 1980, C. L. Hogue, CLH 264 (8 larvae, 4 pupae, 1 male: LACM); Río Sevilla, 8.7 km SW Palmar, 14 March 1980, C. L. Hogue, CLH 267 (14 larvae, 2 pupae: LACM).

ETYMOLOGY

The species is named for Sr. Francisco E. Dávila Riascos, long time resident and prominent rancher of the Sierra whose gener-

ous assistance during my collecting made the discovery of this species possible.

DISTRIBUTION

Limonicola davila is known only from the Sierra Nevada de Santa Marta and appears to be endemic within that mountain system.

ECOLOGY

In all localities where I found *L. davila*, the larvae and pupae were attached to relatively small (10- to 45-cm diameter), smooth stones that were detachable from the substratum; none appeared on vertical faces of large, implanted boulders or portions of exposed basement rock as is the habitat of *Paltostoma* and other blepharicerid genera elsewhere. Larvae exhibit a distinct preference for lodging in small crevasses or notches on the stone's surface. Most collections were of single specimens or groups of only a few individuals. Water temperatures of streams at collecting sites varied from 22° to 25°C.

Although I was not able to verify it by direct observation, the flight posture of the males and their morphology leads me to the hypothesis that they capture females in flight for mating. *Limonicola* males are unique in possessing swollen hind tarsi on extremely long hind legs, twice the length of the others; all the legs of the female are of normal proportions and without special mod-

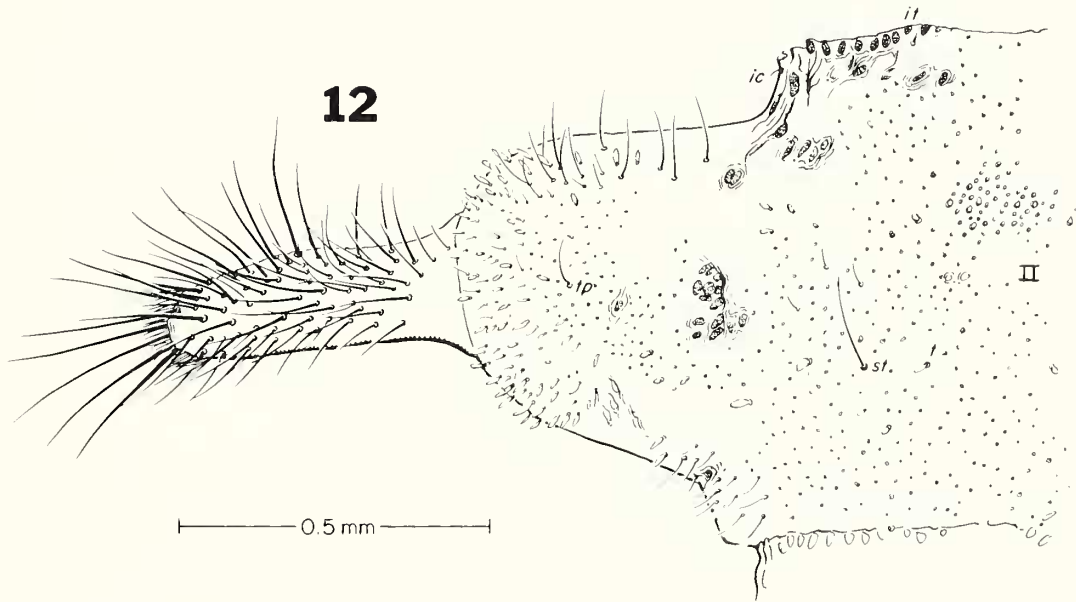


Figure 12. *Limonicola davila*. Larva, fourth instar, dorsal view of left half of abdominal segment II.

Figure 11. *Limonicola davila*. Larva, fourth instar (dorsal left, ventral right), abbreviated sensillar designations explained in Hogue (1978:3-4).

ifications. These features apparently contribute to the male's tendency to fly with the hind legs extended far below the plane of the body in which position they may be used to snare females in flight in a manner similar to the prey capture techniques of certain Mecoptera. This would also explain the sinuously curved fore femora of the females, a configuration that permits them to hold their fore legs upward directly over the body where the male's tarsi could most easily grapple them. That the tarsi of the male are capable of grasping in such a fashion was well demonstrated during field collecting by the way in which adult midges of both sexes become tenaciously entangled by the tarsi of males in a killing tube. The elongate tarsal claws fold back against the calceoli at the base of the last tarsal segment, creating a very effective clasp device. The female lacks this arrangement, logically, being the passive sex in the precopulatory capture scenario.

Because of their very reduced mouthparts, neither sex could possibly prey on other insects as is normal, at least with the female, in most other Blephariceridae. This, plus their overall small size, indicates an ephemeral, possibly nonfeeding, adult life, paralleling that of other diminutive, short-lived torrenticolous midges, such as the Deuterophlebiidae, Nymphomyiidae, and Thaumaliidae.

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LITERATURE CITED

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